UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III – 6th & Walnut Sts.
Philadelphia, Pa. 19106

R+D

SUBJECT: Army Creek (formerly Llangollen Landfill)
New Castle County, Delaware

DATE: May 26, 1977

FROM: Albert Montague, Director
Office of Research and Development (3RD00)

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TO: A. R. Morris
Acting Regional Administrator (3RA00)

This memorandum is in response to your request for a complete update on our efforts regarding the above subject. I have taken the liberty of incorporating some background information that was sent from Greene Jones to Dan Snyder last December on this subject.

Problem:

Simply stated, the leachate contamination from the abandoned Army Creek Landfill is presenting a potentially serious water quality problem with respect to two major aquifers in the area, one of which supplies significant domestic and industrial water needs in the County. The leachate has contaminated several private wells and is threatening the Artesian Water Company wells and the Amoco Chemical Corporation wells. Furthermore, the Artesian Water Company has filed a $6 million dollar suit against the County. Groundwater supplies in northern New Castle County are approaching full utilization, therefore, the loss of such critical aquifers through leachate contamination cannot be tolerated. The landfill was completed in 1968. Apparently the 208 Agency has taken the lead in an attempt to resolve this problem, and based on their consultant's report, corrective costs range from $10 to $25 million.

Background:

The Army Creek Landfill is located near the City of New Castle. It was operated for the County as what appears to be an unregulated receptacle for municipal and industrial wastes, including liquid chemical wastes. More than 2 million cubic yards were placed in the landfill from 1960 to 1968. In 1968 it reached capacity. The fill area itself is roughly 56 acres.

Since the discovery of leachate in the aquifer in the spring of 1972, the pollutant concentrations have increased markedly and the extent of contamination within the aquifer has grown. Realizing the imminent threat to the wells, the County installed recovery wells between the landfill and the Artesian Water Company wellfield in hopes of restricting further leachate migration. This action by the County, combined with the effects of pumping restrictions at the Artesian wellfield may have temporarily stabilized the leachate movement. However, these measures can only be considered temporary.

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Consultants for the County have investigated several alternative actions but, due to a variety of factors, little headway has been made toward implementing a final solution. It is important to note that the alternative of abandoning the aquifer was not considered a viable option in light of the existing water supply problems in the County. Three basic alternatives were explored as possible solutions to the aquifer contamination: First, hydrogeologic isolation of the landfill combined with the collection and treatment of leachate; second, excavation of the refuse, followed by some type of incineration; and third, excavation and transportation of the refuse to another landfill or the ocean. Several problems exist in attempting to implement any of these alternatives, the most serious of which is the lack of funds.

1. Uncertainty exists as to the effectiveness of hydrogeologic isolation of the landfill in providing a final solution to the aquifer degradation within a definite period of time. This doubt stems from a lack of knowledge about the "life span" of the refuse in terms of leachate-generation capabilities since little is known about how much and what was deposited into the landfill. The capital and operating costs are conservatively estimated at $15 million at present value.

2. On-site incineration, involves capital costs ranging from $15 to $25 million. Several incineration techniques were preliminarily evaluated by the County's consultant, including conventional and steam generating incinerators, the Union Carbide Purox system, fluid-bed incineration, and the Black Clawson hydro-disposal system. Serious questions remain about the technical feasibility of all of them, but this alternative cannot be dismissed.

3. While the third alternative noted is the least expensive, about $10 million, and offers a relatively rapid absolute solution, its use entails serious environmental and political problems. Removal to an existing landfill would require extensive environmental controls and would result in an early retirement of that landfill. Construction of a new landfill to receive the refuse would require extensive controls, and would certainly encounter intense political opposition. In addition, the problems associated with transporting such highly offensive material through populated areas is obvious. There is another gravel pit adjacent to Army Creek which could feasibly be used with sound management controls.

To date, New Castle County has spent almost $2 million in studying and monitoring the problem, and in providing temporary abatement measures. These costs, plus minimum corrective costs of at least $10 million, are still much less than the overall long-term costs of abandoning the

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aquifer, in terms of damage and replacement costs. Thus, while the need for correcting the situation is fully appreciated, the affected jurisdictions are hesitant to commit the additional large amounts of money required - $10 to $25 million - particularly for actions which may not provide a satisfactory solution.

EPA has been trying to help the 208 Agency since November of 1974. Our regional involvement in early 1976 showed the best plan of action was to contact the Army Corps of Engineers (Urban Studies Program) for assistance. Potential sources of money investigated but found to be insufficient were: Safe Drinking Water Act; EPA Office of Solid Waste; EPA OR&D; Federal Disaster Assistance Act; HUD Community Development Block Grants. The 208 Agency has been working since February of 1976 with a grant of $10,000 from the EPA Headquarters Office of Solid Waste. The purpose of this study has been to assist EPA in reprioritizing funding for water pollution emphasizing land disposal problems.

Senator Biden's amendment to the Solid Waste Disposal Act, passed in June 1976, authorizes $650,000 for the 208 Agency to study the Llangollen situation, broken down as follows:

$250,000 for technical study,

$400,000 over two years to pay operating expenses necessary to contain the spread of leachate.

Last December, a meeting was held in this regional office to discuss the above considerations with the 208 Agency head, Ms. Hurd. The bottom line of this meeting was that the Regional Administrator would send a letter to the Governor's office, elevating the problem with the hope that at this level of government effective financial support for resolution could be secured. The strategy called for the development of a letter which the State could use as a vehicle to secure special funds or a long-term loan since economics seemed to be the major obstacle. This letter was sent on December 28, 1976 (see attachment).

Current:

On January 19, 1977, the regional Enforcement Division requested that certain recovery wells be sampled to compare present effluent conditions with that found in January 1974. The concern centered around NPDES permit requirements for these active wells. The January 1974 samples were analyzed by our Athens laboratory.

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Concurrently, the regional Water Division was interested in reexamining the water quality of several water supply and monitoring wells to assess the situation and whether any change had occurred since the 1974 sampling.

Congressional interest also surfaced on this issue, apparently precipitated by the December 28, 1976, letter to then Governor Tribbitt. However, upon learning of our intent to again sample the recovery, monitoring and water supply wells since the 1974 analyses, further Congressional discussion was held in abeyance pending this information update.

In support of these concerns, various recovery water supply and monitoring wells were sampled on February 22, 1977. These samples were split with our S&A laboratory at Annapolis and a private contractor (the University of Illinois). The samples were analyzed for volatile organics as well as base and acid extractable compounds. Our ORD research group in Cincinnati supported this effort, which cost $10,000. Unfortunately, the effort yielded some questionable data, which was previously brought to your attention, thus necessitating a reexamination of these findings and as quickly as possible. Nevertheless, a degree of urgency surfaced with respect to Artesian Water Company Supply Well #2, which, based on the analysis, showed a chloroform level of 770 ppb. A reanalysis to confirm or refute the chloroform level was performed on May 13, 1977. This sampling and analysis effort also included two other wells in this wellfield. The results were all negative, thereby allowing us to place the wellfield back in service, since it was taken out of service as a precautionary measure.

On May 19, 1977, a joint resampling program was conducted by representatives from the S&A Division, Water Supply Branch, and the University of Illinois. To avoid any problems in this regard, the latter took their own samples. Six samples were taken from the following sources and will be analyzed for volatile organics:

Artesian Water Company Llangollen Wellfield

1. Finished water
2. Well No. 2
3. Well No. 7
4. Well G-3

Amoco Chemical Company

1. Well No. PW-1
2. Well No. PW-3

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Three other wells were sampled by the AFO and the University. However, a lower priority was placed on their analyses, at least for the present. Analytical results for the first six samples are expected by the first week of June.

Future:

After we receive and analyze the volatile organics data from the water supply wells for Artesian and Amoco, we are planning to resample and analyze the water quality of several recovery and monitoring wells for volatile, base, acid extract organics, inorganics, and heavy metals.

The water supply well information should establish what limits, if any, we must place on the use of these water supply wells.

The recovery and monitoring well resampling data will help us to formulate, where applicable, meaningful NPDES permit requirements. In addition, it will support our efforts to assess the impact of the leachate contamination with regard to groundwater quality, at least up to the monitoring wells, and whether the situation is more or less threatening as it relates to the water supply systems than originally encountered in 1974.

Attachment

cc: Director, Surveillance & Analysis Division (3SA00)
Director, Water Division (3WA00)
Director, Air & Hazardous Materials Division (3AH00)
Director, Enforcement Division (3EN00)